UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT ANTHONY MARIN, LARRY R. MARSHALL and BARBARA K. O'ROURKE

Appeal 2006-2877
Application 09/691,273
Technology Center 1700

Decided: October 11, 2007

Before CHUNG K. PAK, THOMAS A. WALTZ, and CATHERINE Q. TIMM, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C.§134(a) from the Examiner's decision rejecting claim 2-4, 7-18, and 21-30. We have jurisdiction under 35 U.S.C.§6(b).

We AFFIRM.

I. BACKGROUND

The invention relates to polyethylene plexifilamentary fiber strands, nonwoven sheets, and products made therefrom. Claims 28 and 29 are illustrative of the subject matter on appeal:

28. A polyethylene plexifilamentary fiber strand produced by a process comprising flash spinning a solution of 12% to 24% by weight polyethylene in spin agent consisting of a mixture of normal pentane and cyclopentane at a spinning temperature from about 205°C to 220°C to form said plexifilamentary fiber strand having a surface area of less than 10 m^2/g and a crush value of at least 1 mm/g.

29. A nonwoven unitary fibrous sheet produced by a process comprising flash spinning a solution of 12% to 24% by weight polyethylene in spin agent consisting of a mixture of normal pentane and cyclopentane at a spinning temperature from about 205°C to 220°C to form substantially continuous polyethylene plexifilamentary fiber strands having surface areas of less than 10 m^2/g and crush values of at least 1 mm/g, collecting said plexifilamentary fiber strands to form a sheet and bonding said sheet to form said nonwoven unitary fibrous sheet comprised of substantially continuous polyethylene plexifilamentary fiber strands and having a Frazier Permeability, normalized to 1.0 oz/yd^2 basis weight, of at least 2 cfm/ft^2.

The Examiner relies on the following prior art references to show unpatentability:

McGinty	US 6,010,970	Jan. 4, 2000
Blades	US 3,081,519	Mar. 19, 1963
Harriss	WO 98/39509	Sep. 11, 1998
Bisbis	US 5,919,539	Jul. 6, 1999

Appellants rely on the following prior art reference in rebuttal:

Shin	US 5,147,586	Sep. 15, 1992

The Examiner rejects claims 2-4, 7-18, and 24-30 under 35 U.S.C.§ 103(a) as being unpatentable over McGinty or Harriss in view of Blades. To reject claims 21-23, the Examiner adds Bisbis.

II. DISCUSSION

As a first matter, at the time of the Brief, Appellants had attempted to invoke 35 U.S.C.§ 103(c) to disqualify McGinty as prior art (Br. 3). However, the Examiner determined that such attempt was not perfected because Appellants had not included a statement that the reference and the application were co-assigned "at the time the invention was made." (Answer 6). *See MPEP* § 706.02(l)(2)(II) (The statement that the application and patent were, at the time the invention of the application was made, owned by the same company, is alone sufficient evidence to disqualify the patent from use in a rejection under 35 U.S.C.§ 103(a) against the claims of the application). Appellants have now included the required statement (Reply Br. 2). The Examiner has not further challenged Appellants' invocation of 35 U.S.C.§ 103(c). Therefore, we treat McGinty as disqualified prior art. We limit our review to the rejection based on Harriss in view of Blades, and the rejection based on Harris in view of Blades and Bisbis.

The Examiner finds that Harris describes a polyethylene plexifilamentary fiber strand produced by a process that is substantially similar to that claimed (Answer 4 citing Comparative Example 1 of Harriss). The spinning temperature of Harriss' Comparative Example 1 (185°C) is lower than those of the claimed range (205-220°C), but the Examiner finds that temperatures within the claimed range were known in the art as evidenced by Blades (Answer 4-5). The Examiner further finds that, although the physical properties recited in claims 2-4, 7-8, and 28-30, are not explicitly recited by Harriss or Blades, it is reasonable to presume that these properties would be inherent based on similarities in composition and processing such that the burden had shifted to Appellants to prove that the

fiber strands and nonwovens of the prior art would not have the claimed properties (Answer 5).

With respect to claims 28 and 2-4, Appellants contend that Blades is improperly combined with Harris (Br. 5-8). With respect to claims 29, 7-8, and 24-27, Appellants further contend that it is not reasonable to presume that the prior art nonwoven sheet of Harriss would have a Frazier Permeability in the range of claim 29 (Br. 8-9). They further contend, with respect to claims 30 and 12, that it is unreasonable to presume that the nonwoven would have the hydrostatic head and Gurley Hill porosity values of the claims 30 and 12 (Br. 10). Appellants point to their Comparative Examples A and B and Table 3 as showing that the nonwoven of Harriss' Comparative Example 1 would not have the required claimed properties (Br. 9-10 and 11; Reply Br. 7-9).

In light of Appellants' separate arguments, we consider one claim from each grouping of claims. We select claims 28, 29, and 30.

We note that each of the claims is directed to a product. As such it is the structure and properties of the product which are at issue. It has long been held that"[i]f the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1317, 78 USPQ2d 1097, 1101 (Fed. Cir. 2006) (*quoting In re Thorpe*, 777 F.2d 695, [697], 227 USPQ 964, 966 (Fed. Cir. 1985)). Therefore, the temperature at which the fibers are made is only relevant in so far as it affects the end product structure and properties.

For each representative claim, the dispositive issue on appeal arising from the contentions of Appellants and the Examiner is: Is it reasonable to presume that fiber strands and nonwovens made in accordance with Comparative Example 1 of Harris would inherently have properties recited in the claim such that the burden shifted to Appellants to show that the claimed properties are, in fact, not obtained, and, if so, have Appellants met their burden in showing there is a patentable difference in properties?

A preponderance of the evidence of record supports the following Findings of Facts (FF):

1. Comparative Example 1 of Harriss describes flash-spinning plexifilamentary polyethylene from a solution of a composition within the genus recited by the claims on appeal at a temperature of 185°C.
2. Harriss' process of forming the fiber strands is substantially similar to Appellants' claimed process; the difference being that the spinning temperature of Harriss (185°C) is not within Appellants' claimed temperature range (205-220°C).
3. Claim 28 requires that the fiber strands have a surface area of less than 10 m^2/g and a crush value of at least 1 mm/g. Harriss does not disclose the surface area or crush value of the flash-spun fiber strands resulting from the process of Comparative Example 1.
4. In the process of Harriss' Comparative Example 1, the polymer solution was delivered to six spinning positions at a temperature of 185°C and pressure of about 13.8 MPa (2000 psi). Each spinning position had a letdown chamber where pressure dropped to a pressure of about 6.2 MPa (900 psi). The solution then discharged through a spin orifice to a region maintained near atmospheric pressure and a

temperature of about 50°C. The solution was flash-spun into plexifilamentary film-fibrils.

5. Harriss, in Comparative Example 1, further describes forming a non-woven unitary fibrous sheet from the continuous fiber strands. The strands of Harriss are laid down onto a moving belt, consolidated, and collected as a loosely consolidated sheet on a take up roll. The resulting sheet was bonded on a Palmer bonder (between a moving belt and rotating heated smooth metal drum) (Harris, Comparative Example 1, pp. 17-18).
6. Claim 29 is directed to a nonwoven sheet having a Frazier Permeability, normalized to 1.0 oz/yd^2 basis weight of at least 2 cfm/ft^2. Harriss does not disclose the Frazier Permeability of the nonwoven sheet formed by the process of Comparative Example 1.
7. Claim 30 is directed to a nonwoven sheet having a hydrostatic head of at least 110 cm and a Gurley Hill Porosity of less than 6 seconds. Harris does not disclose the hydrostatic head, or Gurley Hill Porosity of the non-woven sheet of Comparative Example 1.
8. Appellants reply upon two comparative examples, Comparative Examples A and B, as showing that nonwovens made in accordance with Harriss' Comparative Example 1 would not necessarily have the properties of the claims (Reply Br. 6-10).
9. Appellants' Specification states that the fiber strands of Comparative Example B were spun on a commercial flash spinning line like that shown in Figure 1. Appellants' Specification does not state which spinning apparatus was used to produce the fiber strands of Comparative Example A, Examples 1-27 being flash-spun in a

process described with regard to Figure 2 (Specification 19:35-36 to 20:1).

10. For the fiber strands of Comparative Example A, the surface area and crush value are not reported. For Comparative Example B, the fiber surface area is reported as 14.78 m^2/g and the crush value as 0.61 mm/g (Specification 27, Table 3).

11. The Specification states that Example B in Table 3 relates to the same sample as Example B in Table 2. Table 3 reports a different entrance angle for Example B than Table 2 indicating that there is at least one difference in processing.

12. Tables 1 and 2 provide results for non-woven sheets flash-spun in accordance with Comparative Examples A and B. There are a number of differences between the process parameters of those examples and the Comparative Example 1 of Harriss. The concentration of cyclopentane and pentane in the spin agent is different (32% cyclopentane/68% pentane versus 40% cyclopentane/60% pentane). Tables 1 and 2 reporting results for Comparative Examples A and B do not report a spin pressure. Table 1 does not report a letdown pressure for Comparative Example A. The polymer flow rate reported for Harriss' Comparative Example 1 (232 lbs/hr) is significantly different than the flow rate reported in Tables 1 and 2 for Comparative Examples A and B (50.2 for A; 61.1 for B). The sheet of Comparative Example B is point bonded and softened (Specification 20:36 to 21:2) whereas Harriss uses a Palmer bonder to bond the whole surface (Harriss, p. 18, ll. 6-10).

13. Bonding conditions have significant effects on barrier properties such as air permeability (Frazier, Gurley Hill) and liquid resistance (hydrostatic head) (Reply Br. 8).
14. According to Blades, the design of the orifice and neighboring structural elements affect the nature of the product obtained (Blades, col. 10, ll. 26-27).
15. The spin pressure affects the nature of the product obtained (see, e.g., Shin, Table 1 at cols. 12-14).

In a case such as this where patentability rests upon a property of the claimed material not disclosed within the art, the PTO has no reasonable method of determining whether there is, in fact, a patentable difference between the prior art materials and the claimed material. Therefore, where the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily possess the characteristics of his claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

Applying the preceding legal principle to the Factual Findings, we determine that the Examiner has established a prima facie case of obviousness that has not been sufficiently rebutted by Appellants.

Claim 28 is directed to an article of manufacture, in particular a fiber strand. As such patentability must rest on the structural differences between the fiber strands of the claim compared to those in the prior art. Differences in the process by which the fiber strand is made are relevant only in so far as they further limit the structure of what is claimed. While Appellants and the Examiner have spent many pages arguing over whether the temperature

range of the claim is rendered obvious by the combination of Harriss and Blades, those arguments do not give rise to a dispositive issue in this case: The issue is whether something in the prior art teaches or suggests the article that is claimed. A difference in temperature is immaterial if the structure and properties of the prior art product and the claimed product are not patentably distinct from each other.

Harriss describes a fiber strand product of the same polyethylene composition made by substantially the same process as that of claim 28 (FF 1-2). The sole difference is the spinning temperature (FF 2). Under the circumstances, it is reasonable to shift the burden to Appellants to show that the claimed fiber strands are, in fact, patentably different from the fiber strands of Harriss. *Best*, 562 F.2d at 1255, 195 USPQ at 433.

Appellants rely upon their Comparative Examples A and B as showing the required patentable difference. But we find these examples insufficiently probative. In order for Comparative Examples A and B to be probative, Appellants must establish that these Examples adequately reproduce the product formed by Harriss' Comparative Example 1 and result in properties outside of the claim.

Appellants have not established that Comparative Examples A and B follow the same process parameters as Harriss' Comparative Example 1 or that differences in such parameters do not impact the properties of the end product. There are a number of unaccounted for differences between Appellants' examples and Harriss' Comparative Example 1. There are, for instance, differences in concentration between pentane and cyclopentane in the spin agent, the spin pressure is not reported for Appellants' Comparative Examples A and B, and the polymer flow rate is much lower than that of

Harriss (FF 12). These differences would be expected to affect the end product properties including the surface area and crush values (FF 14-15).

We further note that no surface area and crush values are reported for Comparative Example A (FF 10). Therefore, this example is limited in probative value for claim 28.

Turning to claims 29 and 30, these claims are directed to non-woven sheets with particular properties not disclosed by Harriss (FF 6-7). The non-woven sheets of Harriss are formed of continuous fibers of a composition encompassed by the claims (FF 1). Again, given the similarities in composition, structure, and processing, it is reasonable to presume that the resultant nonwovens have the properties claimed. Again, the burden is on Appellants to prove otherwise.

Appellants have not met their burden for the reasons stated above and further because it is not clear that the process of laying down the fiber strands and bonding of Comparative Examples A and B is comparative to the process of Harriss' Comparative Example 1. For instance, Comparative Example B uses a point bonded/softened method rather than a Palmer bonding method (FF 12). Bonding conditions, as admitted by Appellants, have significant effects on permeability and hydrostatic head properties (FF 13). Moreover, it is not clear that other parameters that would affect the properties are the same such as belt speed, etc.

Because the difference in temperature between the claim and Harriss is not the issue in this case, we need not consider whether the combination of Harriss and Blades as applied by the Examiner was proper.

OTHER ISSUES

Should this application be further prosecuted, the Examiner should consider the prior art cited in Appellants' Specification including WO 98/07905 issued to Marshall et al. and published on February 26, 1998 alone or in combination with other evidence of unpatentability.

Marshall is directed to a flash-spun nonwoven sheet of high air permeability (low Gurley Hill Porosity) suitable as a filter media (Marshall, Abstract) and also including a discussion of protective apparel applications (Marshall, p. 6, l. 32 to p. 7, l. 2). Marshall discloses that higher air permeability (higher Frazier Permeability, lower Gurley Hill Porosity) is desirable in filter and apparel applications, and discusses the effects of various process parameters and treatments on air permeability and hydrostatic head (Marshall, p. 7, ll. 6-8; p. 7, ll. 29-32 explaining the effect of bonding and corona treatments) and specifically recognizes that lowering polyethylene concentration and raising the spin temperature increases permeability (Marshall, p. 8, ll. 23-33 (FREON-11 spin solution) and p. 9, ll. 13-18 (hydrocarbon-based spin solution); p. 19, l. 8 to p. 20, l. 2, Table 2). Corona treatment increases air permeability (Marshall, p. 28, ll. 11-15). Mechanical softening substantially lowers Gurley Hill Porosity (Marshall, p. 19, ll. 6-8).

Keeping in mind that it is the claimed *product* that must be patentably distinguished from the prior art *product*, the Examiner should consider whether, in light of the guidance offered by Marshall on how to manipulate the process parameters and treatments to increase air permeability and hydrostatic head, one of ordinary skill in the art would have combined those familiar parameters and treatments to obtain fiber strands and nonwoven

sheets with properties within the claimed ranges, the results being predictable. *See KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1739, 82 USPQ2d 1385, 1395 (2007) ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.") and *KSR*, 127 S. Ct. at 1742, 82 USPQ2d at 1397 ("One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.").

We note that Blades discloses a spin temperature range of Tc-45°C to above Tc as the appropriate range, Tc being the critical temperature of the spin solvent (Blades, col. 8, ll. 67-71; Fig. 12).

We note that Shin discloses that the Tc for pentane is 196.6°C and the Tc for cyclopentane is 238.6°C (Shin, Table in col. 7).

We note that it appears that for plexifilametary sheets of less than 3 oz/yd^2, Gurley Hill Porosities of less than 3.1 seconds correspond to Frazier Permeability's of more than 2 $ft^3/min/ft^2$ (2 cfm/ft^2) (Specification 4:24-26).

We also note that Blades discloses that plexifilament strands have a surface area greater than 2 m^2/g, a range overlapping the claimed range of less than 10 m^2/g.

The Examiner should also consider whether it is reasonable to conclude that any strands exemplified by Blades inherently have a surface area and crush value within the claimed ranges.

III. CONCLUSION

We determine that the Examiner established that it is reasonable to presume that fiber strands and nonwovens made in accordance with Comparative Example 1 of Harris would inherently have properties recited in the claims such that the burden shifted to Appellants to show that the claimed properties are, in fact, not obtained, and Appellants not met their burden in showing a patentable difference, in fact, exists.

Further, we present other issues for the Examiner to consider upon further prosecution of the Application.

IV. DECISION

The decision of the Examiner is affirmed.

V. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R.§ 1.136(a)(1)(iv).

AFFIRMED

tc/ls

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